coordinate system. The method using this group of equations is not only simpler but also more rigorous. This group of equations contains a partial differential equation in 2nd order and two ordinary differential equations. In this case $a = \text{const.}$, the two ordinary differential equations can be solved beforehand, and the whole problem is reduced to solve one 2nd order linear partial differential equation with scalar variable only. Several problems relating to the sunspot have been solved, using the above-mentioned method. Considering the sunspot as force-free magnetic field and the expressions of magnetic energy of unipolar and bipolar sunspots.

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25.01.03 Two Dimensional Radiative Transfer in Resonance Line Wings, S.P. Owocki, HAQ - The need for a very high resolution temperature diagnostic in the mid- and upper-photosphere is reviewed. The possibility of using high resolution wing spectra of the Ca K and Mg k resonance lines for this purpose is examined, with particular emphasis on the effect of horizontal radiative transfer on the Ca K and Mg k line-wing intensities in two-component models of the solar atmosphere. No significant influence on the spatially-RESOLVED wing-profiles of either line is found, even for models in which the lateral variation was extreme over distances approaching a vertical scale-height. Horizontal contrast as measured by the spatially-RESOLVED Mg k profile was found to be markedly reduced by lateral transfer over scales at or below the current resolution limit. Contrast as measured in the Ca K wing was relatively unaffected and was maintained down to lateral sizes approaching a vertical scale-height. The behavior of Ca K relative to Mg k is attributed to the larger amount of photon destruction by incoherent scattering in the Ca K wing, which limits the distance that photons can diffuse laterally and forces the line to be formed near LTE. We therefore conclude that the small-scale photospheric temperature structure predicted by many models can be detected in Ca K, and that efforts toward reducing seeing limitations on the resolution of solar observations should be encouraged.

25.02.03 Measured Variation in Solar EUV Emission- R.W. Kreplin, D.M. Heenan, and R.G. Taylor-HERO- Two photometers sensitive in the range 100-450 Å, and

750-1000 Å flown aboard NSF's Solar II B monitored the variation in solar emission from March 1976 to Sept. 1978, a period covering solar minimum and the rise toward maximum of the present solar cycle. While the absolute magnitude of the total change in EUV emission over this period has not been determined, changes in emission with solar rotation have been measured with reasonable accuracy. In the period Jan-Feb 1978 variations of nearly 40% in the 100-450 Å band and 60% in the 750-1000 Å band were observed. This increase of emission was caused by rotation onto the disk of several active regions.

25.03.12 Lα/Hα in Solar Flares and QSs, R.C. CANFIELD and R.C. RUTTER, UCSD - We have observationally and theoretically examined the assertion first made by Zirkin (1978, Ap.J., 222, L105) that the Lα/Hα ratio in various objects, including solar flares and QSs, is around unity. The presently available data base, which has grown considerably in the past two years, indeed confirms that Lα/Hα ~ 1 in both these phenomena. However, the solar flare data contradict Zirkin's statement that the brightness temperature $T_b$ ~ 17,000 K in both Lα and Hα. In moderately large (class 2) flares, $T_b$ ~ 10,000 K in Lα and $T_b$ ~ 7,000 K in Hα. We have extended the theoretical methods that we applied previously to the hydrogen emission line spectrum of QSs, and applied them to solar flares. The theoretical Lα/Hα ratios for our flare models match the observations for values of temperature, density and optical depth that compare favorably with independent estimates. No support, either observational or theoretical, is found for Zirkin's explanation of the Lα/Hα ratio, viz. that Lα and Hα come from plateaus of temperature around 15,000-20,000 K, and that their emission is Planckian. Departures of the computed Lα/Hα ratios from Planckian values are due to the different physical processes by which photons escape in Lα and Hα.

25.04.03 Thermal Radio Emission from Solar Active Regions, G.D. HOLMAN and M.R. KUNDU, U. of MI. - A flexible code has been developed to calculate the brightness temperature and polarization of thermal gyroresonant and bremsstrahlung emission from solar active regions. High resolution radio maps together with UV and X-ray data should yield considerable new information in the near future about the transition zone and pre-flare structures in active regions. The effects of various magnetic field and plasma configurations such as neutral sheets and hot loops upon the thermal radio emission from these regions will be discussed.